Outline

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- **Who is Perficient?**
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Program Description

- The RFID Road Toll Program is a Public to Private Partnership (P3)
    - Requires Highway Use Authority Legislation

- Develop the ability to charge motor vehicles a usage fee for State and County Highway use

- Is one of the first in pursuing Highway Usage Fees to replace the current gas tax by using state wide Radio Frequency Identification (RFID) based toll road revenue generation.

- Other states and countries have expressed interest in the same capabilities

Revenue Opportunity

Current Analysis

2006 Gasoline Tax Revenue (declining)	Anticipated Toll Road Revenue (increasing)
$425,000,000 approx **(at .22 cents per gallon)**	$1.6-1.8 billion **(4.5 million registered vehicles @ .01 cents per mile)**

104,100 square miles   Population 4,301,261

(Michigan = 96,810 square miles   Population 9,938,444)

Business Objectives of the Program

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- Register vehicles and assign RFID tags to individual license plate numbers.

- Collect antenna read information as vehicles pass through intersections or ramps to enter and exit the toll road system.

- Calculate per trip usage fee based on the current toll rate for that section of highway. Gather per trip information by plate number for each registered vehicle, on a monthly basis.

- Send monthly billing information to the billing option selected by the vehicle owner (credit card, EFT/AFT debit, utility company billing, Motor Carrier Association billing or Independent Trucker Association (ITA) billing.)

- Receipt of payment information from the billing option selected, apply fines for unpaid bills or pre-paid accounts with insufficient funds and notify vehicle owners when pre-paid account funds are running low

- Track revenue distribution to state, county and municipal highway departments.
- Allow Highway Use Authority personnel to maintain rates.
- Update rates on electronic highway signs during congested periods, or during special events, etc.
- Exempt certain types and groups of vehicles or vehicle owners.
- Allow law enforcement personnel to query RFID tag registration and set up alert notifications based on an individual license plate numbers. (Amber alert/stolen vehicle)
- Monitor antenna/reader functionality to ensure high availability.
- Replacement of current DMV system for vehicle registration, driver's license registration and motor carrier operations.

Technical Goals

- Leverage homogeneous Systems Environment to reduce support costs and integration complexity, and improve reliability

- Implement RFID Application Frameworks

- Provide a High Availability Environment

- Define a Scalable Solution that can meet future demand, increased capacity, optimized performance requirements

High Level Conceptual Architecture
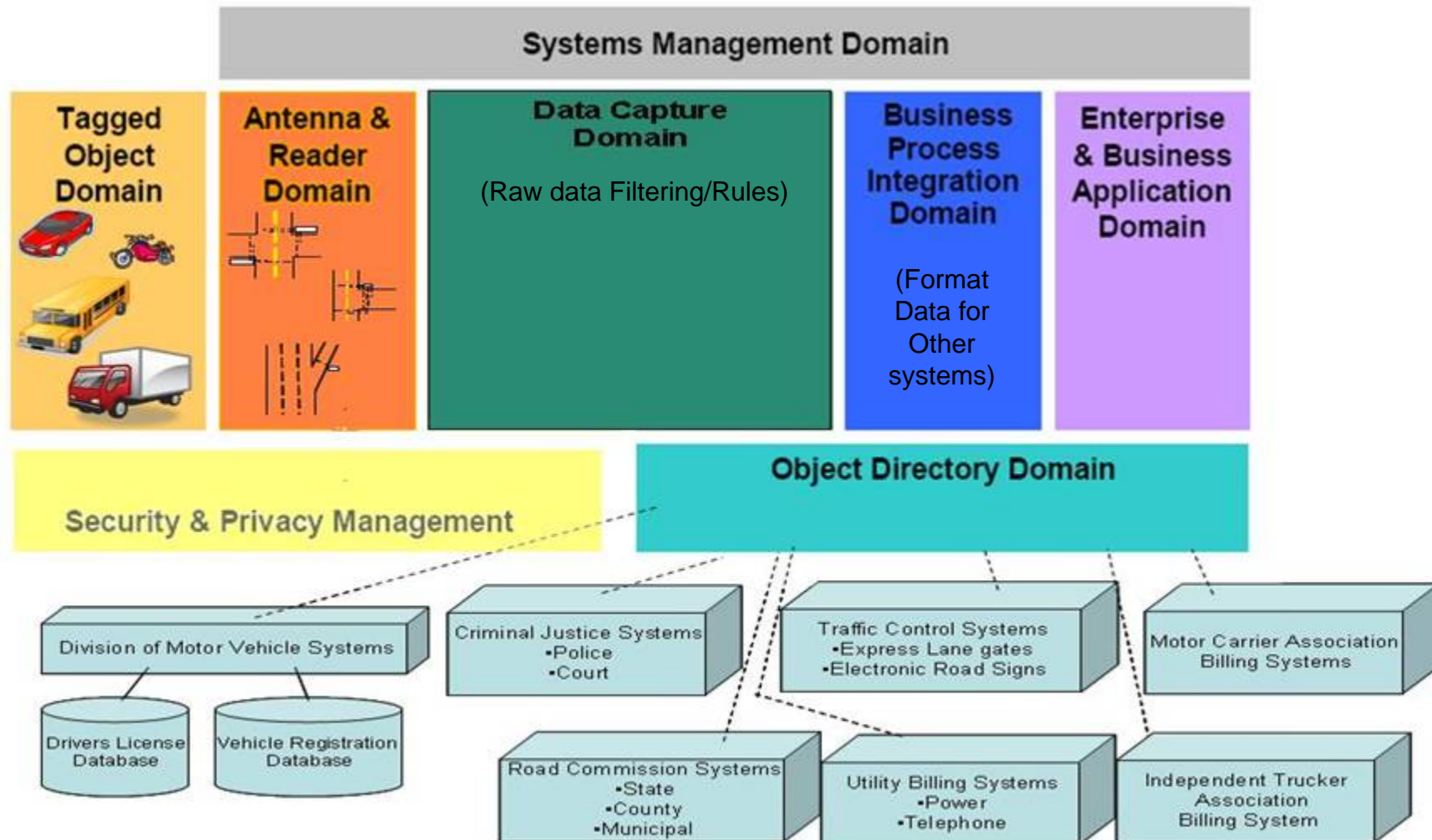
■ What vehicles to track:

– For project described above, out of state passenger vehicles and possibly some recreational vehicles are exempt from the toll.

- If .22 cent gas tax is removed in favor of toll road, that makes gasoline the cheapest in the region
- This encourages tourists to spend their limited vacation dollars where it's cheapest to get around.

– Chose to exclude out of state passenger vehicles since that would involve video capture of license plates with much higher infrastructure and maintenance costs and ROI just wasn't worth it, or require all vehicles to stop at state borders and register which is impractical.

Lessons Learned & Best Practices

- **How to collect money:**
  - Booth-less collection of tolls
    - Requires less infrastructure/manpower
    - Less congestion
  - Utilize billing systems already in place with public utilities for:
    - Printing and mailing itemized bill
    - Collecting revenue
    - Handling disputes by equipping existing utility company call center operators with detailed toll charge data.

- **Provide secure, public web-site for constituents to query toll usage** (similar to tracking cell phone usage)

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- **What tolling technology to use:**
  - Leaky underground coax, and RFID was chosen over GPS and Overhead RFID readers.
    - Underground coax is more weather resistant and vandal proof
    - Leaky coax is in place today in mines in WV to comply with mining safety standards. (http://www.nrcce.wvu.edu/energyforum/docs/Brune.pdf)
  - Overhead RFID readers need to be more temperature tolerant requiring special readers with wider temperature ranges (-40 to +130)
    - Readers used in conjunction w/ leaky underground coax can be placed in a temperature controlled NEMA enclosure along with other road side electrical devices, therefore less expensive readers can be used.
      (http://www.nema.org/prod/be/enclosures/)
  - GPS ability to pinpoint exactly where a vehicle was on the highway was considered too much information for tolling purposes and not worth the cost or public concern about privacy. Is also not contained to state borders. (http://sports.autoblog.com/2006/03/27/oregon-testing-mileage-based-road-tax-system/)

Lessons Learned & Best Practices

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- **So is this too "Big Brother" ?**
  - Cell phone use as you travel from cell tower to cell tower
    - http://articles.latimes.com/2002/sep/06/local/me-onthelaw6
    - M-52 from Owosso to Saginaw would cross M-21 (Owosso), M-57 (Chesaning) and M-46 (Saginaw) for **3** RFID intersections
    - There are **5** cell towers in the same distance
      http://find.mapmuse.com/re1/map_brand_mm2.php?brandID=CELL_TOWERS&init=44.34,-85.9,8&tlist=CELL_TOWERS

  - Credit card use as you shop, purchase food, purchase gasoline
    - Dinner out last night
    - Your favorite drive thru to fuel you on your morning commute
    - Gasoline on the way to work
    - http://www.topix.com/city/marsteller-pa/2008/03/tracking-stolen-credit-card-phila-police-catch-robbery-suspect-at-store

  - Is there a difference?

How we can help – Next Steps

- **Sample Highway Use Authority legislation**
  - (Similar concept to Mackinaw Bridge Authority)
- **Revenue analysis**
  - Statistics on # of highway miles traveled each year
  - # of registered vehicles
  - Toll rate structure (sections of highway, types of vehicles, etc.)
- **What selling points/angles to gain public favor over gasoline tax?**
- **What other groups need to be on board and supportive?**
  - Tourism
  - Trucking
  - Labor
  - Environment
  - etc.

- What roadways? County, State, US, Interstate highways?
    - Is obtaining permission from Federal government worth the cost and effort to place tolls on federally funded highways?
- Toll booths or booth-less?
- What target vehicles, MI resident passenger, out of state passenger, commercial, international?
- Congestion control or not?
- What law enforcement features? (Amber alerts, stolen vehicle, etc.)
- ROI analysis of road toll features to enable better decision making. (i.e. is Video capture worth the expense?)
- Exempt/reduced rate vehicles (i.e. Alternative fuel vehicles, handicapped, low-income, etc.)
- Allow discount for yearly pre-paid account?

(These topics could be the subject of a future TF2 workshop)

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- RFID, GPS, Video or some combination?

- Overhead or underground?

- Passive or active?

- Where to place tag? (i.e. windshield, bumper, underbody)

- Tagging of interstate vehicles (i.e. separate tag for each state or nationwide tag)

- How to bill? (i.e. Credit card, EFT, AFT, Utility Bill, Motor Carrier Account, ITA Account, etc.)

Who is Perficient? Fast Facts:

- Founded in 1997
- Public, NASDAQ: PRFT
- ~$240 million in annualized revenues
    - 20+% organic growth rate
- 17 locations throughout the U.S. & Canada:
    - Atlanta, Austin, Chicago, Cincinnati, Columbus, Dallas, Denver, Detroit, Fairfax, Houston, Indianapolis, Minneapolis, New Orleans, Philadelphia, San Francisco, St. Louis and Toronto
- 1500+ consultants
- Dedicated solution practices
- Served 400+ clients in past 12 months
- Multiple vendor/industry technology and growth awards
- Alliance partnerships with major technology vendors

- Partnered with User Fee Integration, LLC for toll road systems.

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